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A PROPOSED CLASSIFICATION
BY SIZE.



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INTRODUCTION

1. The classification of industrial units by size, be they establishments or enterprises⁽¹⁾, provides basic material for a structural analysis of industry⁽²⁾. A study of structure, in turn, usually leads into functional analysis, that is, to the study of the relationships that exist between parts of structure as, for example, between different types of industrial establishments, service establishments, employee organisations, etc. The relationships that exist between structural units determine, in part, the performance of establishments, industries, and of the whole manufacturing sector⁽³⁾. It is because industrial structure, function and performance are closely related that an attempt is called for to improve and extend present statistical information relating to structure.

2. Hitherto, data, classified according to size of establishments, has been provided only for factories and for employment for the whole of Australia and by individual States. The fact that such data as value of output, value of production, value of factory shipments or, sales, capital expenditure, value of materials used, etc., classified according to size of establishments and geographical subdivision⁽⁴⁾ has not been compiled to date has left a gap in our statistics that should be filled. In this respect statistics in Australia are lagging behind those published by the U.S.A., the United Kingdom, Canada, and New Zealand.⁽⁵⁾

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- (1) The measure of size adopted, for purposes of classification, refers to the general type of unit which is to be measured irrespective of how these units, i.e., establishments, enterprises, etc., have been defined.
- (2) A structural analysis of industry refers to the analysis of the comprehensive arrangement of concrete, persistently observable social groupings in the industrial sector of the economy.
- (3) Performance in this context is taken to relate to the efficiency of resource allocation and utilisation, the degree of competition in the various markets of labour, materials, final products, etc.
- (4) Data classified according to size of establishments and according to geographical subdivision presents a valuable addition to the statistics required to analyse factors of industrial location. For this purpose a geographical classification according to local government areas, where applicable, appears to be suitable.
- (5) See Appendix.

3. This paper is an attempt to examine the problems associated with the classification of economic data by size of enterprises and establishments⁽⁶⁾ and is intended as a contribution to work presently undertaken on the Standard Industrial Classification for Australia. The aim of this paper is to examine the basic concepts of size and its measurement and to arrive at conclusions concerning the units to be classified, appropriate size criteria, the number and span of size classes and, size cut-off points appropriate (a) for future censuses of manufacturing establishments and, (b) for surveys based on census data of large establishments only.

The Problem of Size and its Measurement

4. Economists are generally agreed upon the proposition that there are logical reasons for supposing that, granting the advantages of mechanical and human specialisation, large-scale production, especially when conducted in large establishments, tends to result in maximum efficiency. The expression 'large-scale operation' is properly taken to refer to the large-scale production of any article or service when conducted within one organisation.⁽¹⁾ This belief in the efficiency of large-scale operation (production), whether or not conducted within a one plant firm, is based on the law of increasing returns which states that 'an increase in capital and labour leads generally to an improved organisation which increases the efficiency of the work of capital and labour', or alternatively, as additional supplies of a commodity are produced the cost of each becomes not greater but less! Efficiency in this context is taken as the relation between inputs and outputs and is usually measured by three tests; that of productivity, of returns (especially profits) and, of costs per unit. Rostas⁽²⁾, for example, has shown that in the majority of his sample of compact and homogeneous British manufacturers the net and gross value

(6) The term 'establishment' used throughout this paper is taken as broadly representative of the establishment as defined in the paper "Some Thoughts concerning the Economic Unit from which Statistical Information is to be Collected", part B, sections:- 23, 24, 40. This paper was compiled in the Adelaide Office and dated 18.9.1962. A definition of the 'enterprise' has been formulated in par. 24 of this paper.

(1) Though not identical 'large-scale operation' usually implies 'large-scale organisation'. For example, a plant employing a thousand men concentrating on one stage of production of a single article is operating on a larger scale than the same sized plant working on the production of several articles.

(2) Rostas, 'Productivity, Prices and Distribution in Selected British Industries, 1948, page 45.

of output per worker increases with the size of plant. An example where profits have been used as a test of comparative efficiency is that of Professor Mehta⁽³⁾ who used rates of dividend of Indian cotton companies of various sizes (measured in spindles). The results of his investigations were that the larger companies were found to be more efficient, on the whole, than the smaller, and that the typical size of plant has been increasing.

5. The relationship between the size of establishments and efficiency of production has consequently a very real bearing on economic policy with regard to such questions as taxation, protection⁽⁴⁾, etc.; and while a classification of establishments by size and by industry classes can provide some information bearing on this problem the classifications in use are usually too broad to be of much help. For significant relationships to be revealed a classification by size of establishments would be needed which classifies establishments not simply according to statistical industry classes (however homogeneous) and size but also according to type of organisation (single plant, multi-plant), location and age. Thus, comparability of conditions, except of the variables size and efficiency, are essential to any classification attempting to provide basic information useful for investigations into the relationship between scale of production and efficiency of production.

6. The economic relationship between size of establishments and their location is usually interpreted as a balancing of costs of procurement (transport of materials and fuels from their natural sources) or costs of distribution (transport of produce to market) as against costs of smaller scale manufacturing nearer to markets or materials.⁽⁵⁾ The relationship between size and location consequently depends on the relationship between scale of production and efficiency of production on the one hand and the location and nature of markets on the other. The nature of markets is, however, determined, at least in part, by the number and size distribution of enterprises which constitute these markets. This relationship between size of enterprises and their market behaviour is reviewed in the following paragraphs.

(3) M.M. Mehta, 'Structure of Cotton-Mill Industry of India, 1949', pp. 161-167.

(4) The infant industry argument is a very particular example of the relationship between size and economic efficiency in the context of the Australian economy.

(5) Hoover, 'The Location of Economic Activity', 1948.

7. The competitive behaviour of enterprises is largely determined by the number and size distribution of enterprises within industry groups centred around common markets for labour, materials and finished goods. The market behaviour of enterprises, in turn, affects significantly the terms of exchange : the amounts of goods, services or factors exchanged and the prices, wages, profits etc., at which they exchange. Where individual enterprises singly, in the form of monopolies, or in combination, in the form of cartels, trusts, etc., act to restrict competition, a misallocation of national resources, a possible check in innovative progress and, a rise in prices may result. A structural approach to questions of market behaviour, in general, and to monopoly and restrictive practices, in particular, will, therefore, (quite apart from providing the economic theorist with data concerning (a) the economic efficiency of enterprises operating within a monopolistic structure and, (b) the extent and means by which monopolies, cartels, etc., grow) provide the practical possibility of detecting in what industries or types of industry the tendency to monopoly and thus the danger of exploitation is the strongest. Structural analysis cannot perhaps do more than establish the whereabouts of monopoly and the areas within which monopoly exploitation may be lurking, but at least attention will be directed to real situations.

8. In this connection the structural approach to competitive market behaviour in particular industries found its first practical application approximately 25 years ago in two American and in one, later, British enquiry (all based on census data) in which measures were worked out, for various industries, of the degree to which production is concentrated in a very few firms or combines. Thus in 'Structure of the American Economy' the National Resources Committee published a ratio of the persons employed by the 4 largest producers (or companies) compared to the total number of persons in the industry, for industries distinguished by the Census of Manufactures in 1935. Similarly the 'U.S. Temporary National Economic Committee' in its Monograph 27 gives a similar ratio of concentration for 1807 products made by these industries. For Britain in 1935 Leak and Maizels (Statistical Journal, 1945, pp. 151-159) give the proportions of persons in the largest 3 business units for 302 trades or subdivisions. These units include holding companies with their subsidiaries. (6)

(6) For measures of concentration published currently overseas see Appendix.

9. The analysis into the economic significance of size, contained in the foregoing paragraphs, could be summarized by stating that there are basically two aspects of size to be distinguished:-

- (a) Size relating to the technical aspects of production, that is, to the relationship between scale of production and efficiency of production and,
- (b) size relating to the competitive aspect of distribution, that is, to the relationship between market structure (the number and size distribution of enterprises within industries centred around common markets) and market behaviour.

This dual aspect of size complicates both the collection and presentation of economic data classified according to size of reporting units because each size-aspect is associated with a different type of reporting unit : size relating to the technical aspects of production is associated with establishments because establishments approximate the unit of production while size relating to the competitive aspects of distribution is associated with enterprises because enterprises usually control sales, purchases and, the general commercial policy of the concern. Consequently where economic data is to be classified by size two classifications are needed, one where data is classified according to size of establishments and the other, where data is classified according to size of enterprises. A dual classification of this nature is prepared for and published in the United Kingdom Census of Production⁽⁷⁾.

10. Size of industrial entities consequently is not a unique concept and acquires a specific meaning only in relation to the thing intended to be measured, that is, it would be meaningful to measure the scale of production of an establishment or the market strength of an enterprise. In the following, therefore, size of establishment is taken to refer to their scale of production while size of enterprises is taken to relate to their market strength. In this way the two aspects of size are identified with specific industrial entities as shown in the previous paragraph.

(7) U.K. Board of Trade. 'The Report on the Census of Production for 1958.' Lond. H.M.S.O. 1960.

11. The question of how to measure the size of establishments or of enterprises, however, introduces an added difficulty: there is no unambiguous measure according to which the size of these units can be measured. The size criteria which have been used in the past are merely indicators of size, not direct measures. In the highly simplified world of microeconomic theory, for example, enterprises and establishments are identical and these belonging to a particular theoretical industry produce only one homogeneous output. The size of these theoretical firms has traditionally been measured by physical output units. Though perhaps the most appropriate indicator of size, physical output can obviously not be used where establishments and enterprises produce a heterogeneous output. More practical indicators of size which have been used are value of output, value of production, value of capital employed (buildings, plant, machinery, etc.) and, employment. The fact, however, that these indicators do not measure size directly should not be forgotten. Strictly speaking each of these indicators orders establishments and enterprises by employment, value of output, etc. The question to what extent employment, value of output, etc. measure size, or in other words, the extent to which these measures are ~~synonymous~~^{SYNONYMOUS} with size defies precise determination.

12. Attention, at this stage, should be drawn to a further complication which accompanies the use of these size criteria : inter industry comparisons of establishments and enterprises classified according to a common size criterion are not strictly permissible, particularly where marked differences exist in factor-mix and cost of materials between industries. A detailed classification of establishments and enterprises according to a common size criterion showing the size distribution for each industry sub-class is therefore more meaningful, permitting questions of inter industry comparisons to be resolved by the final users of these data, than the same classification presenting the data in a highly summarized form, that is, by major industry classes or in total for the whole economy.

13. Four size criteria were mentioned in paragraph 11; value of output, value of production, value of capital employed and, employment. The question which remains is: which of these criteria should ideally be used and to what extent will their use yield comparable results? Literature on this problem, as far

as can be ascertained, is practically non-existent and is usually restricted to vague and often unsubstantiated observations regarding the ^{sustainability} ~~inability~~ of size criteria. For example:-

"The size of manufacturing establishments is generally measured either by the value of factory shipments or by the number of employees but each of these methods has its limitations. The former measure has to be adjusted for changes in the price level and, as between industries, it makes those in which the cost of raw materials is relatively high appear to operate on a larger scale. The latter takes no account of the differences in capital equipment at different times or in various industries and obviously the increased use of machinery may lead to an increase in production concurrently with a decrease in the number of employees."

(Source:- Canada Year Book, 1957-58, page 676.)

".... An industry which is being increasingly mechanised may be employing less labour whilst making an increasing contribution to the national output. There is no more justification for assessing the size of industries by manpower employed than by capital employed. Statistics of real value of capital employed for the various industries do not exist."

(Source:- Beacham, A. 'Economics of Industrial Organisation'. p.156.)

"To measure scale by number of employees would tend to underestimate industrial expansion linked with labour saving innovations. Similarly trends in the ratio of value added on capital per establishment may diverge significantly from the movement of scale. ... while records of capital value are flagrantly unreliable in that they are subject to the judgement of the person making the estimate and to the vagaries of long and short term fluctuations in prices."

(Source:- S.S. Sands, "Changes in Scale of Production in United States Manufacturing Industry, 1904-1947. Review of Economics and Statistics. Nov. 1961. p. 365.)

14. The suggestions contained in the United Nations handbook 'Studies in Methods: Industrial Censuses and Related Inquiries', N.Y. Oct. 1953, Vol. I. pp. 58-59 and 200-204, are not more helpful than the foregoing. The task of selecting the most suitable size criterion according to which establishments and enterprises are to be classified therefore still remains. This selection will be attempted in the following paragraphs.

The Selection of Suitable Size Criteria

15. Of the four size criteria referred to above value of capital employed, that is, value of plant and machinery plus the value of land and buildings must be eliminated as a possible measure of size because the data which can be collected, at the present time, are unreliable and often quite unrealistic. The reason for this is that firms record on their respective factory returns the value of land and buildings and of plant and machinery at book values irrespective of how these book values have been arrived at and, irrespective of the extent to which they have been written down. Employment as a measure of size can be used either in the form of average number of persons employed during the period of operations or, in the form of number of man hours worked over the corresponding period. While the average number of persons employed is the conventional measure, used in almost all countries, it seems less accurate a measure of size compared to that of man hours worked.. The suggestion of adopting man hours worked would, however, raise the objection that comparability with overseas data and the continuity with previous Australian data classified by size would be impaired. Average number of persons employed should consequently be retained as a possible measure of size. Value of output and value of production need no further qualification at this stage and there appear to be no objections against their use. Of four possible criteria thus three remain:-

- (1) Average number of persons employed during the period of operations,
- (2) value of output and,
- (3) value of production.

The period of operations is conventionally taken as the 12 months period ending June 30th.

16. These three size criteria, however, apparently possess one inherent weakness which, in addition to the problems associated with the concept of size itself (two aspects: 1. scale of production, 2. market strength) and the difficulties of measuring it (~~none~~ of the size criteria measures size directly but only a particular dimension of size, e.g., employment, output, etc.), raises the question of how to interpret size when establishments produce below their capacity levels. In other words, where the degree of plant utilization and consequently employment and output varies in the short run the size of the establishments is subject to the same short run variation if measured by 'average numbers employed' or, by 'value of output'. One particular aspect of this problem is found where some establishments operate continuously (employing shift workers) while others stand idle over night. The question which consequently presents itself is whether the size of establishments (as measured by output or employment) which operate below their capacity can be taken as representative of their scale of production. At first it was thought that only a measure of capacity could reflect scale⁽¹⁾, and that changes in output or employment would not represent changes in the scale of production as long as the existing plant remained unchanged. This supposition, however, was found to be true only in the case where the whole of the plant must be used to produce any output at all, that is, in the absence of plant segmentation. Segmentation allows the rate of output to be varied without changing the proportions of variable inputs to the fixed equipment in use (e.g., the ratio of man-hours to machine-hours). In this sense it refers to the technical nature of the fixed equipment which permits a wide range of choice in the machine-hours used. The degree of plant segmentation ranges from complete and continuous to none at all. An example of no segmentation is a single blast furnace which must be operated continuously. Commonly three sources of plant segmentation are distinguished:-

- (1) Unit segmentation which permits the successive introduction, or withdrawal, of (homogeneous) machine units allowing wide variability in machine use despite its overall fixity,

(1) Strictly speaking scale of production is a dynamic concept and refers to the increase in output that can be achieved if all factors of production are increased and, vice versa. If, however, all factors but one (say capital) are increased the resultant increase in output is not due to an increase in scale which remains constant.

- (2) time segmentation which permits variation in the number of hours, or shifts, worked and,
- (3) speed segmentation which permits machines to be used at varying speeds.

With rare exceptions most industrial plants are capable of segmentation today and a restriction of output usually represents a simultaneous reduction of employment, materials used and, of plant and machinery. In the presence of plant segmentation establishments can, therefore, by varying all their inputs, change their scale of production in the short run⁽²⁾ (that is, without resorting to new investment in plant and machinery or the need to scrap existing fixed equipment). The fears which were expressed at the beginning of this paragraph, namely that employment or output measures could not indicate scale of production where establishments operate below their maximum capacity levels, are, therefore, largely without substance.

17. The question which of the three size criteria to adopt will depend on:-
- (1) the extent to which their use will yield comparable size distributions,
 - (2) the extent to which comparability with (a) previous Australian data and, (b) overseas data, will be maintained and,
 - (3) the extent to which data are available and the ease with which they can be applied to classify establishments and enterprises by size.

If, for example, the application of the different size criteria could be expected to yield substantially similar size distributions there would be no apparent need to classify establishments by two or more size criteria as is the practice in certain countries, New Zealand among them. Comparability of economic data over time and with similar data published elsewhere is too obvious an aim to need elaboration here. In the following, therefore, each of the three size criteria will be examined in accordance with the requirements outlined in (1), (2) and, (3) above.

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- (2) Economic theorists have hitherto assumed that changes in scale are only possible in the long run. The assumptions upon which this conclusion was based disregarded, however, the possibility of plant segmentation.

18. The extent to which the use of the three size criteria could be expected to yield similar size distributions depends on the relationship between the three different criteria. On the whole, a positive relationship can be expected because when establishments extend their scale of operations employment and output will rise. To obtain some knowledge of the nature and the strength of this relationship six South Australian census industries were selected⁽³⁾, the factories, their value of production and value of output in each industry were tabulated by average number of persons employed and the data plotted on scatter diagrams. These diagrams revealed a linear and positive relationship, between the variables 'average number of persons employed', on the one hand, and value of output and value of production, on the other, for each of the selected industries. Two regression equations, one showing the linear regression of value of output on 'average number of persons employed' the other showing the linear regression of value of production on 'average number of persons employed', were derived, by the method of least squares, for each of the six industries. Each of the regression lines, when drawn into the respective scatter diagrams, fitted the given plot points reasonably well. In order to obtain a more precise measure of the strength of the relationship (goodness of fit) the coefficient of linear correlation was calculated for each of the twelve regressions. The results are shown in Table 1. below.

(3) The industries were selected more or less at random the only consideration being that the selected industries should contain not too few nor too many individual factories. If too few, the results would not have been meaningful, if too many, the calculations would have become too unwieldy. The period of operations was taken as the year ended June 30th, 1959.

TABLE I.

Coefficients of Linear Correlation between Value of Output and Employment and, between Value of Production and Employment by Industry.

S.A., 1958/59.

Industry	Coefficient of Linear Correlation between	
	Value of Output and Employment (r ₂)	Value of Production and Employment (r ₂)
II.3. Glass other than Bottles	0.76	0.79
IV.2. Foundries (ferrous)	0.76	0.97
IV.9. Motor Vehicles, Construction and Assembly	0.93	0.99
VI. Textile and Textile Goods (not Dress)	0.96	0.97
IX.10. Jam, Fruit and Vegetable Canning	0.70	0.44
IX.21. Aerated Waters, Cordials, etc.	0.75	0.79

19. The correlation tests show quite a strong relationship between the three size criteria. It is noteworthy that the relationship between employment and value of production is, with one exception⁽⁴⁾, stronger than that between employment and value of output. Such a result was perhaps only to be expected because, on the average, employment would be more closely related to work done than to value of output which contains cost of materials used.

20. Even though the tests have shown a strong relationship between the three size criteria their acceptance must be subject to certain reservations:-

- (1) The results apply to one year only and there is no indication of how the relationships could change over the years. It would be reasonable to assume, however, that any such changes would be relatively small because the correlation between employment and

(4) The correlation between value of production and employment in the Jam, Fruit and, Vegetable Canning Industry was relatively poor. The reason for this was that many establishments in the industry used out-dated equipment while others had modernized their plant thereby causing marked differences in labour productivity between plants. In addition some co-operative canneries paid higher than average prices for materials used thereby reducing their value of production well below that of firms of similar employee size.

output would only be affected (a) where labour productivity changed substantially in some establishments but not in others within one industry (where changes in labour productivity are uniform over the whole industry the correlation between employment and output would not be affected) and, (b) where some establishments, within an industry, vary their 'value' of output but not necessarily their 'physical' output over time (where price changes are uniform over the whole industry the correlation between employment and output would again remain unaffected). On the whole, however, correlation coefficients are not likely to change materially over the years, firstly, because labour productivity itself changes relatively slowly and, secondly, because price changes which substantially affect the value of output of firms, within industries, are rare.

- (2) The results are applicable to South Australia only. A slightly lower correlation could have been expected if Australia wide data had been used because production techniques, factor - and commodity prices would normally vary more widely over the whole of Australia than between South Australian establishments.

Thus, even if the correlation coefficients were to be reduced somewhat, to take account of the reservations mentioned above, a strong relationship between the three size criteria would still obtain and their use could, therefore, be expected to yield substantially similar size distributions.

21. On the basis of the above correlation tests each of the three criteria would appear suitable for the purpose of classifying establishments by size. Of the three criteria, however, only 'average number of persons employed' satisfies the second test, that is, the requirement that comparability with both international and previous Australian data⁽⁵⁾ be maintained. Other measures, value of factory shipments for example, are sometimes used but these seem to supplement rather than form the basic size classification. An indication of the measures used by certain selected countries is given in Table II below. To

(5) Even though substantial changes must be expected in the content and nature of industry classes, once the new classification has been drawn up, a certain degree of comparability with factories classified by size, before the introduction of the new classification, will be maintained.

this should be added the consideration that the United Nations⁽⁶⁾ has advocated employment as a suitable size criterion for adoption by its member nations. The trend on the international scene would, therefore, be to use an employment measure.

TABLE II.

Size Criteria used in Selected Countries.

Country	Reporting Unit	Size Criteria
U.S.A.	Establishments	1. Average number of persons employed (reckoned by average employment of the 4 mid-month payroll periods in March, May, August, November).
United Kingdom	Establishments	1. Average number of persons employed (reckoned by averaging the employment of the last week of each calender month).
	Enterprises	do.
Canada	Establishments	1. Average number of persons employed. 2. Value of factory shipments.
New Zealand	Establishments	1. Average number of persons employed. 2. Value of output. 3. Value added

22. The requirement that suitable data should be available and easy to apply is met by each of the three size criteria. Employment and value of output data are reported on factory forms while value of production can easily be calculated for each establishment from information already collected. Value of output and value of production do, however, reflect changes in the price level and are, therefore, not suitable where comparisons over time have to be made. 'Average number of persons employed' during the period of operations would consequently recommend itself as the logical criterion to use in a classification of establishment by size.

(6) U.N. Studies in Methods: Industrial Censuses and Related Enquiries. Vol I. pp. 58, 59, 200 - 204.

23. A classification of establishments and establishment data by size, while appropriate for investigations into industrial structure and certain aspects of production, e.g. scale and efficiency of production, cannot be used where an analysis of markets is contemplated. Enterprises rather than establishments control the buying and selling policies which affect prices, the supply of raw materials and of finished goods as well as the demand for labour and other services. A classification of enterprises and enterprise data by size and by industry is, therefore, the appropriate medium to use where a study of markets, the type of competition in these markets and, market concentration is contemplated. (Ref. par. 7-10 above). In addition to the basic information relating to markets - sales, employment, for example, - data appropriate to enterprise units have an important bearing on the financial aspects of the economy - profits, overseas investment, capital expenditure, assets, liabilities, etc. Before a classification of enterprises can be attempted, however, an operational definition of the enterprise which identifies real entities suitable for the collection of data must be formulated and, the question what item of data to use to classify enterprises by size must be solved.

24. The enterprise can generally be described as an aggregate of productive resources organised for the production of goods and services subject to unified control. An enterprise may consist of one or more firms, that is, entities operating under a specific trading name, as for example private and public companies, partnerships, single proprietorships, etc. The firm, in turn, may consist of one or more establishments. An enterprise, therefore, may consist, on the one hand, of a single one-establishment firm, e.g. a single proprietorship, while on the other, it may comprise a number of firms, each carrying on business under a separate name, regarded in law as distinct entities, but controlled by a holding company or a cartel agreement. The enterprise, defined in this fashion, is not an entity which can easily be identified in practice and, in the absence of legislation requiring firms to disclose the extent and nature of their association with other firms, if any, makes it virtually impossible to compile a register of enterprises. As a result of the recent enactment of uniform company legislation in Australia,

however, the most serious obstacles in this regard have been removed. Under the provisions of the uniform Companies Acts all companies registered under the Acts are required to state the name and place of incorporation of their subsidiary companies, if any, (defined in sec. 6 of the Acts) in accordance with the requirements contained in Schedule 9 of the Acts. A working definition of the enterprise, similar to that used in the United Kingdom Census of Production⁽⁷⁾, can consequently be formulated and a list of enterprises compiled from information lodged with the Registrar of Companies in the several States and from other sources, e.g., the register of Payroll Taxpayers. The question to what extent enterprises can be classified by industry within a Standard Industrial Classification poses serious difficulties principally because most enterprises engage in diverse activities, e.g., the production of goods normally classified to different industry classes or, different **sectors** even, e.g., wholesaling, retailing, transport, finance. For some purposes, e.g., size classification which is to serve as a medium for market studies, enterprises could be split (along establishment lines) by industry classes while for other purposes, e.g., the presentation of financial data, such splits may not be appropriate. In the latter case the possibility of developing suitable groupings would appear to present the only practical alternative to splitting. In the former case, that is, where splitting must be resorted to if data suitable for an analysis into market structures is to be presented certain additional information could be supplied showing the nature and extent of the splits involved. For examples:-

(7) U.K. Board of Trade, The Report on the Census of Production for 1958. Lond. H.M.S.O. 1960. The enterprise refers to one or more firms under common ownership or control as defined in the U.K. Companies Act of 1948, and it normally consists of a single firm or a holding company together with its subsidiary companies.

TABLE III

Classification of Establishments, Enterprises and other Data in each Industry according to Number of Persons employed.

Industry and Item	Total	Establishments and Enterprises with average employment of -		
		1 - 4	5 - 9	etc.
IV ₂ Foundries (ferrous)				
1. Enterprises (no.) (a)				
2. Establishment. "				
3. Employment "				
4. etc. £'000				
8. Establishments classified to other industries (no.) (b)				
9. Employment classified to other industries (no.)				
10. etc.				
IV ₃ etc.				

Notes:- (a) The data presented by individual industries relates to whole enterprises and parts of enterprises (split along establishment lines) classified to this industry.

(b) Item 8, 9, etc. relates to parts of enterprises, consisting of one or more establishments which, though associated as regards ownership and control with parts of enterprises in this industry, have been classified to other industries according to the nature of their output.

These considerations presuppose that a register of enterprises in terms of its component establishments be compiled and that registers of establishment, used in the different collections, be co-ordinated with the register of enterprises. If this is done

- (1) each establishment, irrespective of whether it is a wholesale, retail or, manufacturing establishment, can be identified with a particular enterprise,
- (2) problems of coverage and overlapping can be resolved and,
- (3) establishment data can be consolidated into enterprise data and

presented for whole enterprises or parts of enterprises (split along establishment lines) according to requirements.

In accordance, then, with the general definition of the enterprise and the practical considerations of collection and presentation, as discussed in this and the previous paragraph, the following operational definition of the enterprise is proposed:-

The enterprise consists of:

- A. One or more companies - each registered under the Companies Acts as a distinct entity, each operating under a specific trading name - under common ownership or control as defined by the Companies Acts of 1962. The enterprise consequently consists of a single company or a holding company together with its subsidiary companies.
- B. One or more firms - other than companies registered under the Acts, e.g., single proprietorships, partnerships, etc., each operating under a specific trading name - subject to unified control. (The term 'common' or, 'unified control' in this section is meant to convey the same meaning as in section A.)

Note:- Any company or firm may, in turn, consist of one or more establishments.

Type B enterprises cannot be easily identified in practice as no statutory provision exists which requires their registration. As, however, the vast majority of enterprises would consist of type A enterprises, which, on the whole, comprise the larger and economically more significant units, the omission of type B enterprises would not significantly affect published statistics. Nevertheless a register of type B enterprises could slowly be built up from information coming to hand during collections, possibly also from special enquiries and, local knowledge.

25. The question what item of data to use to classify enterprises by size suggests two possibilities: (1), 'average number of persons employed' and (2), sales. If a sales figure were used to classify enterprises, and if

'average number of persons employed' were used to classify establishments, the two classifications could not be integrated into one scheme; a result that would mean the loss of substantial economies in the preparation and presentation of data classified by size. A sales figure, also, would reflect changes in the price level and would, therefore, not be suitable where comparisons over time become important. On the other hand, the advantage of using a sales figure is that it would represent more directly, than an employment measure could, the market strength of enterprises. (Ref. par. 9.10). This, however, is true only as long as it relates to markets where enterprise products are sold. The influence which enterprises may exert over markets for inputs, e.g. labour, services, materials, etc., could not logically be gauged by a sales figure. On balance 'average number of persons employed' would, consequently, suggest itself as the appropriate criterion to use.

The Number and Span of Size Classes

26. The general principle governing the number and span of size classes requires that a distribution of establishments and enterprises by size is arrived at which distinguishes significant size groupings within industries. If too few size classes were used important features of the distribution, e.g., clusters of firms around a certain size or, the concentration of employment in establishments of certain sizes⁽¹⁾, could well be lost among the data contained in the necessarily wide size groupings. For analytical purposes, therefore, a size distribution consisting of many classes - each with a relatively narrow span - would appear to be the most useful arrangement. On the other hand, the number of size classes which can be used is obviously limited, on the outside, by the actual number of establishments and their distribution. Such a limit to the number of size classes in Australia would,

(1) C.B.C.S. Secondary Industries Bulletin, 1958/59. Industry IX.10 (Jam, Fruit, and Veg. Canning) in South Australia, for example, consists of 13 establishments where more than 50%, (7), of the establishments have an employee size ranging between 64 ± 11 and which produce approximately 73% of the industry value of output.

however, be encountered only if the existing number of size classes would be increased considerably, a step for which there is no apparent justification.

27. The decision as to where the lower and upper limits to class intervals should be fixed depends:-

- (1) on the number of classes and their span,
- (2) on size points which tend to correspond with marked differences in organisation and scale of operations between industrial establishments and,
- (3) on the extent to which comparison with data classified by size in other countries is facilitated.

Differences in scale and organisation between establishments probably occur at different points in different industries. In the absence of a specific enquiry, aimed to establish at what point differences in scale and organisation actually do occur and if any such points are common to all industries, the decision as to where the lower and upper limits to class intervals should be fixed must, to a considerable extent, remain arbitrary. United Nations experts have recommended, however, that countries, which utilize employment as a size criterion, adopt the following points as common lower class limits: 5, 10, 50, 100, 500 and 1000⁽²⁾. These numbers, it is claimed, approximate marked differences in the scale of operations and organisation among industrial establishments generally. Another consideration, affecting the decision as to where the upper or lower class limits should be fixed, requires that international comparability in size classifications be facilitated. For this purpose a table showing size classes used in selected countries has been compiled to serve as a guide in the determination of class limits suitable to Australian conditions:-

(2) U.N. Studies in Methods: Industrial Censuses and Related Enquiries.
Vol. I. p. 59, 203.

TABLE IV.

Size classes in terms of 'Average Number of Persons Employed' used in Selected Countries.

Country:	Australia	New Zealand	United Kingdom	Canada	U.S.A.
Size Classes:	1- 3	.			
	4	1- 5	1- 5	1- 4	1- 4
	5- 10	6- 10	6- 10	5- 14	5- 9
	11- 20	11- 20	11- 24		10- 19
	21- 50	21- 50	25- 49	15- 49	20- 49
	51- 100	51-100	50- 99	50- 99	50- 99
	101- 200	101-200	100- 199	100-199	100- 249
	201- 300	201 and	200- 299	200-499	250- 499
	301- 400	over	300- 399		
	401- 500		400- 499	500-999	500- 999
	501- 750		500- 749		
	751-1000		750- 999	1000 and over	1000-2499
	1000 and over		1000-1499		
			1500-1999		
			2000-3999		
			4000-4999		2500 and over
			5000 and over		

The table reveals a close correspondence in class limits between the different countries, an indication that any contemplated changes in present Australian size classes could be of a minor nature only.

In taking note of considerations advanced, in this and the previous paragraph, as regards

- (1) the number of size classes (there should be many rather than few),
- (2) the desirability that class limits should correspond to differences in scale and organisation between establishments (according to U.N. experts such differences occur at the following points: 5, 10, 50, 100, 500, 1000),
- (3) the requirement that international comparability in size classifications should be facilitated and,
- (4) the United Nations recommendation that governments utilize the foregoing magnitudes (5, 10, 50, 100, 500, 1000) as lower limits for some of the class intervals in their classification schemes,

the following size classes are being recommended for adoption in Australia within the framework of the proposed Standard Industrial Classification: 1-4; 5-9; 10-19; 20-49; 50-99; 100-149; 150-199; 200-249; 250-299; 300-399; 400-499; 500-749; 750-999; 1000 and over.

Size Cut-Off Points

28. The decision what cut-off points to use (a) for establishment censuses and, (b) for business and other surveys depends to some extent on the frequency with which censuses and sample surveys are to be conducted. If a census of manufacturing establishments is to be taken at comparatively infrequent intervals, e.g., once every 4 to 5 years, the need for comprehensive data, as regards the number of establishments, employment, value of output, value of production, materials used, etc., as a basis for the more frequent surveys into manufacturing activity and for structural analysis of industry, would seem obvious. In this case, that is, where the census aims to cover all establishments, information which is to be obtained from smaller establishments, e.g., employing 9 or less persons, could well be limited to employment, salaries and wages, nature of activity, value of output and value of production. If, on the other hand, a census of manufacturing establishments is to be conducted on a more frequent basis, e.g., annually, small establishments could be excluded from the census altogether. A special census of small establishments could then be conducted at less frequent intervals as required. Sample surveys into manufacturing and other activity could, in turn, be based, either, on census data covering all establishments (both small and large) or, on census data covering large establishments only. The employment level which distinguishes small from larger establishments becomes then, by definition, the size cut-off point (a) for a census which excludes small establishments and (b) for surveys based on census data of larger establishments only.

29. The selection of a suitable size cut-off point for a census of manufacturing establishments and for surveys based on census data involves the balancing of certain advantages against certain disadvantages. In other words a cut-off point should be selected which reduces the work of collection, vetting and, tabulation to a minimum consistent with a minimum loss in coverage in terms of value of output, value of production and, employment. As a guide to the selection of suitable size cut-off points factory establishments together with corresponding employment and output data were tabulated in order of employee size and by industry. The data contained in these tables has been

extracted from tabulation sheets of the annual factory collection in South Australia and the periods to which it relates covers 1958/59 and 1960/61.

Table V presents the data for selected industry sub-classes, table VI presents the data for principal industry classes and includes all factory establishments in South Australia while table VII presents the data by principal industry classes excluding repair establishments. The repair establishments which were excluded from table VII comprise establishments normally included in:-

Class IV, part of sub-class 6	- repairs electrical
, " " " " 11	- motor body repairs
, sub-class 10	- motor repair workshops
Class V, sub-class 1 & 2	- watch and jewellery repairs
Class VIII, sub-class 11	- footwear repair
, sub-class 14	- dying and drycleaning
Class XIII, sub-class 2	- tyre retreading

Table VII, consequently, should be read together with table VI for classes which contain no repair establishments. Attention, at this stage, should perhaps be drawn to the fact that the item 'total number of establishments' in some industry classes and sub-classes as shown in these tables does not tally with the number of establishments as presented in official publications. For example, the total number of establishments shown in table VI, class I reads 163 whereas the official figure reads 166 for 1958/59. These differences, usually small, arose where certain establishments, which were split originally in terms of employment only, had to be consolidated again because output data was only available on a consolidated basis for these establishments.

TABLE V.

Classification of Establishments, Value of Output and, Employment according to Size of Establishments. Selected Industry Sub-Classes, S.A., 1958/59. (These sub-classes do not contain repair establishments.)

Industry	Average Number of Persons Employed during Period of Operations (numbers stated are inclusive)	Factories		Value of Output %	Employment %	Industry	Average Number of Persons Employed during Period of Operations (numbers stated are inclusive)	Factories		Value of Output %	Employment %
		No.	%					No.	%		
IV. 2. Foundries (ferrous)	1 to 4	5	20.8	2.7	3.0	IX.10 Jam, Fruit & Veg. Canning	1 to 4	1	7.7	0.1	0.4
	1 " 6	7	29.2	4.4	5.1		1 " 6	1	7.7	0.1	0.4
	1 " 8	11	45.8	8.0	10.4		1 " 8	2	15.4	0.9	1.3
	1 " 10	14	58.3	14.4	16.0		1 " 10	2	15.4	0.9	1.3
	1 " 15	16	66.7	17.0	20.4		1 " 15	5	38.5	4.0	5.9
	1 " 20	17	70.8	20.2	23.8		1 " 15	5	38.5	4.0	5.9
	1 " 30	19	79.2	32.2	33.8		1 " 20	5	38.5	4.0	5.9
	1 " 50	21	87.5	51.1	50.8		1 " 30	5	38.5	4.0	5.9
	1 " 50	21	87.5	51.1	50.8		1 " 50	5	38.5	4.0	5.9
	TOTAL	24	100	100	100		TOTAL	13	100	100	100
IV.9. Motor Vehicles Construction and Assembly	1 to 4	0	0	0	0	IX.21. Aerated Waters, Cordials, etc.	1 to 4	18	39.1	4.5	8.6
	1 " 6	1	10	1.0	0.9		1 " 6	25	54.3	7.7	14.8
	1 " 8	2	20	1.8	2.2		1 " 8	31	67.4	12.2	22.1
	1 " 10	2	20	1.8	2.2		1 " 10	33	71.7	16.2	25.3
	1 " 15	3	30	4.3	4.4		1 " 15	37	80.4	22.7	34.1
	1 " 20	4	40	6.2	7.5		1 " 15	37	80.4	22.7	34.1
	1 " 30	6	60	13.8	15.8		1 " 20	39	84.8	26.6	40.4
	1 " 30	6	60	13.8	15.8		1 " 20	39	84.8	26.6	40.4
	1 " 50	7	70	25.8	23.4		1 " 30	43	93.5	44.6	56.9
	TOTAL	10	100	100	100		1 " 50	43	93.5	44.6	56.9
	TOTAL	10	100	100	100		TOTAL	46	100	100	100
II.3. Glass, Other than bottles	1 " 4	7	33.3	0.9	1.9						
	1 " 6	8	38.1	1.3	2.5						
	1 " 8	9	42.9	1.6	3.5						
	1 " 10	12	57.1	3.3	7.2						
	1 " 15	13	61.9	3.8	9.1						
	1 " 20	13	61.9	3.8	9.1						
	1 " 30	14	66.6	6.9	12.3						
	1 " 50	17	81.0	18.5	27.8						
	TOTAL	21	100	100	100						

Classification of Establishments, Value of Output, Value of Production and Employment according to Size of Establishments and Industry Classes. All Establishments, S.A. 1958/59 and 1960/61.

In- dus- try Class	Average Num- ber of Pers- ons Employed during period of operations (Numbers stated are inclusive)	Establishments				Value of Output				Value of Production				Employment			
		1958/59		1960/61		1958/59		1960/61		1958/59		1960/61		1958/59		1960/61	
		(no.)	% of total	(no.)	% of total	(£'000)	% of total	(£'000)	% of total	(£'000)	% of total	(no.)	% of total	(no.)	% of total	(no.)	% of total
I.	1 to 4	73	45			981	9							183	9		
	1 " 5			103	57			1,096	9			472	8			257	11
	1 " 6	96	59			1,310	13										
	1 " 8	110	68			1,545	15										
	1 " 10	120	74	137	75	1,826	18	2,480	19			1,023	17	508	25	503	22
	1 " 12	130	80			2,244	22										
	1 " 15	137	84	153	84	2,588	25	3,550	28			1,492	26			710	31
	1 " 20	145	89	159	87	3,398	33	4,368	34			1,837	31	858	42	821	36
	1 " 25	147	90	165	91	3,518	34	4,799	38			2,087	36			955	41
	TOTAL	163	100	182	100	10,288	100	12,727	100		100	5,848	100	2,065	100	2,308	100
II	1 to 4	11	16			47	1							27	1		
	1 " 5			20	26			120	2			56	1			45	2
	1 " 6	16	24			95	1										
	1 " 8	20	30			134	2										
	1 " 10	26	39	32	42	242	4	273	3			155	3	141	6	135	6
	1 " 12	29	43			316	5										
	1 " 15	35	52	44	58	464	7	566	7			334	7			269	12
	1 " 20	40	60	49	64	609	9	740	9			447	10	343	16	354	15
	1 " 25	42	63	50	66	785	11	795	10			478	10			375	16
	TOTAL	67	100	76	100	6,862	100	7,912	100		100	4,577	100	2,172	100	2,290	100
III	1 " 4	29	33			287	1							67	2		
	1 " 5			40	45			590	3			282	3			101	3
	1 " 6	39	44			589	3										
	1 " 8	44	50			948	4										
	1 " 10	52	59	58	65	1,252	6	2,191	10			977	11	234	7	250	8
	1 " 12	54	61			1,382	6										
	1 " 15	58	66	63	71	1,695	8	2,443	12			1,072	12			313	11
	1 " 20	62	71	65	73	3,015	14	3,234	15			1,406	16	384	12	345	12
	1 " 25	67	76	67	75	3,766	17	3,433	16			1,467	16			391	13
	TOTAL	88	100	89	100	22,252	100	20,955	100		100	8,992	100	3,214	100	2,976	100

In- dus- try Class	Average Num- ber of Pers- ons Employed during period of Operations (numbers stated are inclusive)	Establishments				Value of Output				Value of Production				Employment			
		1958/59		1960/61		1958/59		1960/61		1958/59		1960/61		1958/59		1960/61	
		(no.)	% of total	(no.)	% of total	(£'000)	% of total	(£'000)	% of total	(£'000)	% of total	(£'000)	% of total	(no.)	% of total	(no.)	% of total
IV	1 to 4	873	47			4,858	3							2,222	4		
	1 " 5			1,433	61			8,136	4			4,142	5			3,454	6
	1 " 6	1,121	61			7,820	5										
	1 " 8	1,278	69			10,667	6										
	1 " 10	1,384	75	1,841	78	13,273	8	16,820	8			8,782	10	5,811	11	6,524	12
	1 " 12	1,453	79			15,391	9										
	1 " 15	1,524	82	1,995	85	18,190	11	22,492	11			11,608	13			8,453	15
	1 " 20	1,606	87	2,075	88	22,025	13	27,000	13			13,886	15	9,093	17	9,852	17
	1 " 25	1,644	89	2,125	90	24,137	14	31,298	15			15,814	17			11,105	20
	TOTAL	1,851	100	2,355	100	171,025	100	210,051	100		100	92,014	100	52,033	100	56,447	100
V	1 " 4	34	57			113	15							78	18		
	1 " 5			90	87			305	32			227	36			188	41
	1 " 6	43	72			197	25										
	1 " 8	46	77			242	31										
	1 " 10	50	83	95	91	317	40	393	41			286	45	187	42	227	49
	1 " 12	51	85			332	42										
	1 " 15	52	87	97	93	347	44	455	48			321	50			249	54
	1 " 20	54	90	99	95	443	57	521	54			363	57	249	56	285	61
	1 " 25	55	92	99	95	473	60	521	54			363	57			285	61
	TOTAL	60	100	104	100	785	100	957	100		100	636	100	443	100	464	100
VI	1 " 4	16	31			86	1							44	2		
	1 " 5			22	39			164	2			77	2			61	2
	1 " 6	23	45			186	3										
	1 " 8	27	53			315	4										
	1 " 10	31	61	36	64	513	7	623	7			233	6	148	6	169	7
	1 " 12	32	63			536	7										
	1 " 15	36	71	39	70	705	9	778	9			310	8			206	8
	1 " 20	39	77	40	71	1,043	13	820	9			335	9	272	11	225	9
	1 " 25	39	77	45	80	1,043	13	1,484	17			546	14			343	14
	TOTAL	51	100	56	100	7,890	100	8,643	100		100	3,861	100	2,556	100	2,530	100

In- dus- try Class	Average Num- ber of Pers- ons Employed during period of Operations. (Numbers stated are inclusive)	Establishments				Value of Output				Value of Production				Employment			
		1958/59		1960/61		1958/59		1960/61		1958/59		1960/61		1958/59		1960/61	
		(no.)	% of total	(no.)	% of total	(£'000)	% of total	(£'000)	% of total	(£'000)	% of total	(£'000)	% of total	(no.)	% of total	(no.)	% of total
VII	1 to 4	10	26			47	1							25	2		
	1 " 5			18	46			111	2			52	4			50	4
	1 " 6	15	40			131	2										
	1 " 8	18	47			173	3										
	1 " 10	22	58	24	62	297	5	240	4			121	9	113	9	97	8
	1 " 12	23	61			321	5										
	1 " 15	26	68	29	74	463	8	444	7			214	15			159	14
	1 " 20	29	76	30	77	542	9	476	8			236	17	218	18	175	15
	1 " 25	31	82	32	82	693	12	609	10			282	20			220	19
	TOTAL	38	100	39	100	5,979	100	6,131	100		100	1,420	100	1,235	100	1,147	100
VIII	1 " 4	155	43			439	5							351	7		
	1 " 5			310	63			836	9			547	10			641	13
	1 " 6	195	54			754	9										
	1 " 8	222	61			990	12										
	1 " 10	246	68	371	76	1,305	16	1,534	16			1,015	19	1,010	20	1,092	21
	1 " 12	256	71			1,531	18										
	1 " 15	273	75	408	83	1,846	22	2,327	25			1,499	28			1,567	31
	1 " 20	295	82	435	89	2,449	29	3,088	33			2,016	38	1,772	35	2,060	40
	1 " 25	313	87	446	91	3,039	36	3,493	37			2,276	43				
	TOTAL	362	100	491	100	8,406	100	9,402	100		100	5,290	100	5,006	100	5,087	100
IX	1 " 4	256	38			2,211	4							678	6		
	1 " 5			343	47			3,150	5			1,219	7			852	8
	1 " 6	352	52			4,301	8										
	1 " 8	408	60			6,090	11										
	1 " 10	442	65	482	67	7,900	14	8,772	14			2,907	17	1,957	18	1,922	18
	1 " 12	467	69			9,548	17										
	1 " 15	509	75	550	76	12,607	23	14,028	22			4,490	25			2,773	25
	1 " 20	556	82	595	82	17,949	32	19,207	30			5,826	32	3,719	34	3,581	33
	1 " 25	573	85	620	86	20,273	36	22,793	36			6,872	38			4,152	38
	TOTAL	677	100	723	100	55,789	100	63,171	100		100	18,081	100	10,988	100	10,902	100

TABLE VI. (Cont.)

In- dus- try Class	Average Num- ber of Persons Employed during period of Operations. (numbers stated are inclusive)	Establishments				Value of Output				Value of Production				Employment			
		1958/59		1960/61		1958/59		1960/61		1958/59		1960/61		1958/59		1960/61	
		(no.)	% of total	(no.)	% of total	(£'000)	% of total	(£'000)	% of total	(£'000)	% of total	(£'000)	% of total	(no.)	% of total	(no.)	% of total
X	1 to 4	135	40			649	4							349	7		
	1 " 5			179	50			1,131	6			661	9			453	9
	1 " 6	182	55			1,270	7										
	1 " 8	211	63			1,954	11										
	1 " 10	229	69	258	71	2,395	14	3,253	17			1,520	20	974	19	1,048	21
	1 " 12	247	74			3,032	17										
	1 " 15	263	79	287	80	3,609	20	4,268	24			2,009	26			1,416	28
	1 " 20	279	84	304	84	4,684	26	5,413	29			2,350	30	1,758	34	1,757	34
	1 " 25	289	87	314	87	5,370	30	6,497	34			2,714	35			1,968	39
	TOTAL	334	100	361	100	17,762	100	18,992	100		100	7,720	100	5,106	100	5,094	100
XI	1 " 4	78	47			427	8							199	10		
	1 " 5			125	60			658	10			333	11			263	12
	1 " 6	89	53			558	10										
	1 " 8	107	64			947	18										
	1 " 10	114	68	157	75	1,098	21	1,272	19			638	21	460	23	506	23
	1 " 12	122	73			1,709	32										
	1 " 15	130	78	168	81	1,921	36	1,955	30			938	31			648	30
	1 " 20	135	80	173	83	2,070	39	2,277	35			1,086	36	749	38	733	34
	1 " 25	140	84	181	87	2,361	44	2,797	43			1,299	43			919	42
	TOTAL	167	100	208	100	5,339	100	6,568	100		100	3,029	100	1,993	100	2,186	100
XII	1 " 4	36	24			212	2							103	3		
	1 " 5			56	32			351	2			213	2			175	4
	1 " 6	55	36			459	3										
	1 " 8	65	43			582	4										
	1 " 10	81	54	95	54	940	7	1,049	6			639	7	434	11	480	10
	1 " 12	91	60			1,141	8										
	1 " 15	102	68	118	67	1,471	11	1,806	11			1,073	12			773	17
	1 " 20	112	74	132	75	1,894	14	2,338	14			1,448	17	876	21	1,024	22
	1 " 25	118	78	136	78	2,241	17	2,563	16			1,599	19			1,118	24
	TOTAL	151	100	175	100	13,559	100	16,495	100		100	8,632	100	4,112	100	4,612	100

In- dus- try Class	Average Num- ber of Pers- ons Employed during period of Operations. (Numbers stated are inclusive)	Establishments				Value of Output				Value of Production				Employment			
		1958/59		1960/61		1958/59		1960/61		1958/59		1960/61		1958/59		1960/61	
		(no.)	% of total	(no.)	% of total	(£'000)	% of total	(£'000)	% of total	(£'000)	% of total	(£'000)	% of total	(no.)	% of total	(no.)	% of total
XIII	1 to 4	27	47			290	7							73	6		
	1 " 5			32	65			456	9			233	9			85	7
	1 " 6	36	63			461	11										
	1 " 8	37	65			531	13										
	1 " 10	42	74	56	86	664	16	998	20			525	19	174	14	196	16
	1 " 12	45	79			755	18										
	1 " 15	48	84	59	91	925	22	1,137	23			590	22			233	19
	1 " 20	51	90	61	94	1,080	26	1,353	27			680	25	305	24	269	22
	1 " 25	52	91	62	95	1,133	27	1,579	32			798	29			292	24
	TOTAL	57	100	65	100	4,165	100	4,993	100		100	2,741	100	1,251	100	1,228	100
XIV	1 " 4	6	67			15	34							13	38		
	1 " 5			8	80			27	55			23	62			15	52
	1 " 6	8	89			32	74										
	1 " 8	8	89			32	74										
	1 " 10	9	100	10	100	43	100	49	100			37	100	34	100	29	100
	1 " 12	9	100	10	100	43	100	49	100			37	100	34	100	29	100
	1 " 15	9	100	10	100	43	100	49	100			37	100	34	100	29	100
	1 " 20	9	100	10	100	43	100	49	100			37	100	34	100	29	100
	1 " 25	9	100	10	100	43	100	49	100			37	100	34	100	29	100
	TOTAL	9	100	10	100	43	100	49	100		100	37	100	34	100	29	100
XV	1 " 4	23	46			98	4							54	7		
	1 " 5			46	67			242	9			138	10			118	14
	1 " 6	28	56			178	8										
	1 " 8	33	66			264	11										
	1 " 10	36	72	52	75	315	13	354	13			211	15	151	18	163	19
	1 " 12	37	74			335	14										
	1 " 15	38	76	56	81	390	16	514	19			281	21			212	24
	1 " 20	40	80	60	87	466	20	689	26			371	27	215	26	283	32
	1 " 25	43	86	62	90	678	29	887	33			470	34			333	38
	TOTAL	50	100	69	100	2,379	100	2,683	100		100	1,370	100	829	100	871	100

In- dus- try Class	Average Num- ber of Pers- ons Employed during period of Operations (numbers stated are inclusive)	Establishments				Value of Output				Value of Production				Employment			
		1958/59		1960/61		1958/59		1960/61		1958/59		1960/61		1958/59		1960/61	
		(no.)	% of total	(no.)	% of total	(£'000)	% of total	(£'000)	% of total	(£'000)	% of total	(£'000)	% of total	(no.)	% of total	(no.)	% of total
XVI	1 to 4	27	71			134	1							50	3		
	1 " 5			24	67			174	1			106	2			56	3
	1 " 6	32	84			250	2										
	1 " 8	34	90			319	3										
	1 " 10	34	90	28	78	319	3	329	3			173	3	94	6	85	5
	1 " 12	34	90			319	3										
	1 " 15	34	90	29	81	319	3	418	4			190	3			99	6
	1 " 20	35	92	30	83	360	4	627	5			348	6	112	7	117	7
	1 " 25	35	92	31	86	360	4	728	6			416	7			142	8
	TOTAL	38	100	36	100	10,233	100	11,900	100		100	5,813	100	1,588	100	1,784	100
TOTAL I-XV	1 " 4	1,762	43			10,758	3							4,466	5		
	1 " 5			2,835	57			17,373	4			8,675	5			6,758	7
	1 " 6	2,298	56			18,342	6										
	1 " 8	2,634	64			25,414	8										
	1 " 10	2,884	70	3,704	74	32,380	10	40,301	10			19,069	12	12,339	13	13,341	14
	1 " 12	3,046	74			38,615	12										
	1 " 15	3,240	79	4,076	81	47,264	14	56,812	15			26,268	16			18,010	18
	1 " 20	3,452	84	4,287	86	61,711	19	71,573	18			32,323	20	20,848	22	21,773	22
	1 " 25	3,562	86	4,418	88	69,554	21	83,597	21			37,102	23			24,795	25
	TOTAL	4,125	100	5,003	100	332,524	100	389,729	100		100	164,248	100	93,037	100	98,171	100
TOTAL ALL ESTAB- LISH- MENTS (I-XVI)	1 " 4	1,789	43			10,892	3							4,516	5		
	1 " 5			2,859	57			17,547	4			8,781	5			6,814	7
	1 " 6	2,330	56			18,592	5										
	1 " 8	2,668	64			25,733	8										
	1 " 10	2,918	70	3,732	74	32,698	10	40,630	10			19,242	11	12,433	13	13,426	13
	1 " 12	3,080	74			38,934	11										
	1 " 15	3,274	79	4,105	81	47,583	14	57,230	14			26,458	16			18,109	18
	1 " 20	3,487	84	4,317	86	62,071	18	72,200	18			32,671	19	20,960	22	21,890	22
	1 " 25	3,597	86	4,449	88	69,914	20	84,325	21			37,518	22			24,937	25
	TOTAL	4,163	100	5,039	100	342,757	100	401,629	100		100	170,061	100	94,625	100	99,955	100

Classification of Establishments, Value of Output, Value of Production and, Employment according to Size of Establishments and Industry Classes. Excluding Repair Establishments in Classes IV, V, VIII and, XIII, S.A., 1958/59 and 1960/61.

Indus- try Class	Average Num- ber of Pers- ons Employed during period of Operations (Numbers stated are inclusive)	Establishments				Value of Output				Value of Production				Employment			
		1958/59		1960/61		1958/59		1960/61		1958/59		1960/61		1958/59		1960/61	
		(no.)	% of total	(no.)	% of total	(£'000)	% of total	(£'000)	% of total	(£'000)	% of total	(£'000)	% of total	(no.)	% of total	(no.)	% of total
IV	1 to 4	285	33			1,975	1										
	1 " 5			421	43			2,885	1.5			1,590	2			962	2
	1 " 6	378	44			3,360	2										
	1 " 8	451	52			4,901	3										
	1 " 10	511	59	602	61	6,663	4	7,862	4			4,023	5			2,348	5
	1 " 12	552	64			8,147	5										
	1 " 15	602	70	697	71	10,405	7	11,679	6			5,848	7			3,539	7
	1 " 20	660	77	754	77	13,383	8	15,383	8			7,646	9			4,538	9
	1 " 25	685	80	790	81	14,935	9.5	18,375	9.5			8,948	11			5,371	11
	TOTAL	860	100	979	100	159,314	100	192,554	100		100	82,136	100		100	48,416	100
V	1 " 4	5	25			23	5										
	1 " 5			8	44			52	9			39	11			14	6
	1 " 6	9	45			61	12										
	1 " 8	10	50			83	16										
	1 " 10	14	70	11	61	158	31	114	20			78	21			53	21
	1 " 12	14	70			158	31										
	1 " 15	14	70	12	67	158	31	140	24			98	27			64	26
	1 " 20	16	80	14	78	255	50	206	36			140	38			100	40
	1 " 25	16	80	14	78	255	50	206	36			140	38			100	40
	TOTAL	20	100	18	100	508	100	577	100		100	367	100		100	248	100

In- dus- try Class	Average Num- ber of Pers- ons Employed during period of Operations (Numbers stated are inclusive)	Establishments				Value of Output				Value of Production				Employment			
		1958/59		1960/61		1958/59		1960/61		1958/59		1960/61		1958/59		1960/61	
		(no.)	% of total	(no.)	% of total	(£'000)	% of total	(£'000)	% of total	(£'000)	% of total	(£'000)	% of total	(no.)	% of total	(no.)	% of total
VIII	1 to 4	70	34			207	3										
	1 " 5			127	53			388	5			226	6			296	8
	1 " 6	95	46			395	6										
	1 " 8	114	55			537	8										
	1 " 10	127	61	154	64	719	11	705	9			410	11			498	13
	1 " 12	133	64			887	13										
	1 " 15	140	68	175	73	1,004	15	1,189	16			653	17			772	20
	1 " 20	154	74	191	80	1,375	21	1,631	22			913	24			1,068	28
	1 " 25	168	81	200	83	1,867	28	1,948	26			1,113	29			1,274	33
	TOTAL	207	100	240	100	6,622	100	7,526	100		100	3,849	100		100	3,854	100
XIII	1 " 4	3	43			16	1										
	1 " 5			5	63			25	1			17	1			7	1
	1 " 6	3	43			16	1										
	1 " 8	4	57			86	3										
	1 " 10	4	57	5	63	86	3	25	1			17	1			7	1
	1 " 12	4	57			86	3										
	1 " 15	4	57	5	63	86	3	25	1			17	1			7	1
	1 " 20	4	57	5	63	86	3	25	1			17	1			7	1
	1 " 25	5	71	5	63	139	5	25	1			17	1			7	1
	TOTAL	7	100	8	100	2,753	100	3,438	100		100	1,960	100		100	943	100
TOTAL ALL ESTAB- LISH- MENTS (I-XVI)	1 " 4	1,063	36			7,412	2										
	1 " 5			1,545	47			11,164	3			5,504	3			3,739	4
	1 " 6	1,420	49			13,191	4										
	1 " 8	1,664	57			18,910	6										
	1 " 10	1,852	63	2,141	65	24,765	8	29,591	8			13,162	8			8,293	9
	1 " 12	1,978	68			30,203	9										
	1 " 15	2,137	73	2,435	74	37,927	12	43,851	12			19,058	12			11,989	13
	1 " 20	2,315	79	2,611	80	51,172	16	57,483	15			24,442	15			15,137	17
	1 " 25	2,407	82	2,722	83	58,327	18	67,987	18			28,485	18			17,697	20
	TOTAL	2,927	100	3,269	100	327,574	100	380,321	100		100	157,692	100		100	90,190	100

30. A size cut-off point of 21, for example, which means that establishments employing 20 persons or less are to be excluded from the census, would, according to table VI, reduce the number of returns collected by approximately 85%. Coverage in terms of (1) value of output would, however, be reduced by only 18%, (2) value of production by 19% and, (3) employment by 22% on the average, compared to present levels of coverage. According to table VII, which excludes repair establishments, the number of returns, collected at present, would be reduced by approximately 79 or 80% with an attendant loss of coverage in terms of (1) value of output of 16 or 15%, (2) value of production of 15% and, (3) employment of 17% on the average. It is obvious from the tables, however, that the application of a uniform cut-off point would affect different industries differently as regards coverage. The same size cut-off point of 21, for example, would, according to table V, reduce the number of returns collected at present in industry IV.9 by approximately 40% with an attendant loss of coverage in terms of output of approximately 6% and, in terms of employment of approximately 8%; while corresponding magnitudes in industry IX.21. read 85%, 27% and 40% respectively. A uniform cut-off point, selected on the basis of average data for all industries will, consequently, discriminate, as regards coverage, against industries where the bulk of output and employment originates in small establishments. The possibility, therefore, of using different cut-off points for different industry classes should be explored.

31. As long as firm decisions have not been made as regards the future treatment of repair and service establishments, at present included in the annual factory collection, and as regards the nature and frequency of future collections, of both census and survey type, only tentative recommendations concerning suitable size cut-off points can be made at present. Assuming, however, that the bulk of repair establishments is to be excluded from future censuses of manufacturing establishments and, that a loss of coverage in terms output and employment of approximately 10% or more is undesirable, the following size cut-off points, based on South Australian data, are recommended:-

TABLE VIII.

Recommended Size Cut-Off Points for Industry Classes

Class of Industry	Size Cut-Off Points (number of persons employed)
1. Treatment of non-metalliferous mine and quarry products	5
2. Bricks, pottery, glass, etc.	10
3. Chemicals, dyes, etc.	10
4. Industrial metals, etc.	20
5. Precious metals, etc.	5
6. Textile and textile goods	20
7. Skins and leather	10
8. Clothing	10
9. Food, drink and, tobacco	5
10. Sawmills, joinery, etc.	5
11. Furniture, bedding, etc.	5
12. Paper, stationery, etc.	10
13. Rubber	20
14. Musical instruments	5
15. Miscellaneous products	5
16. Heat, light and, power	20

Note:- (a) A size cut-off point of 5, for example, means that establishments employing 4 persons or less are to be excluded.

(b) The size cut-off points recommended in this table were made to coincide with the lower class limits proposed at the end of par. 27, a procedure recommended by the U.N. (Studies In Metals: Industrial Censuses and Related Enquiries. Vol. I. p. 203).

(c) Industry Class XIV could be regarded as a special case (considering its relatively small contribution to value of output and value of production) permitting a cut-off point of 5 to be used, for the sake of uniformity, even though value of output covered would thereby be reduced by approximately 50 per cent.

The adoption of these size cut-off points would mean a reduction of approximately 60% in the number of returns collected and processed in South Australia at present and a loss of coverage in terms of value of output of approximately 7% and, in terms of employment of approximately 9% on the basis of 1960/61 data, excluding repair establishments.

Summary of Recommendations

32. In this paper almost all aspects of size classification have been touched upon ranging from the consideration of basic concepts to such practical matters as the examination of suitable size criteria, of data to be classified by size, the number and ^{span}~~span~~ of size classes, etc. There is perhaps no better way than to express the different considerations advanced in this essay in the form of recommendations which define and prescribe the framework for the classification of economic data by size suitable to Australian conditions. It is therefore recommended:-

- I.(1) That, both, enterprises and establishments (together with data as recommended in III hereunder) be classified by size in one co-ordinated classification scheme. (Ref. par. 9, 10, 23, 24, 25).
- (2) That the enterprise be defined as consisting of:-
 - A. One or more companies - each registered under the Companies Acts as a distinct entity, each operating under a specific trading name - under common ownership or control as defined by the Companies Acts of 1962. The enterprise consequently consists of a single company or a holding company together with its subsidiary companies.
 - B. One or more firms - other than companies registered under the Acts, e.g., single proprietorships, partnerships, etc., each operating under a specific trading name - subject to unified control. (The term 'common' or, 'unified control' in this section is meant to convey the same meaning as in section A).

Note: Any company or firm may, in turn, consist of one or more establishments. (Ref. par. 24).
- (3) That a register of enterprises in terms of their component establishments be compiled and, that registers of establishments, used in the different collections, be co-ordinated with the register of enterprises allowing:-
 - (a) each establishment, whether wholesale, retail or, manufacturing to be identified with a particular enterprise and,

(b) establishment data to be consolidated into enterprise data which could then be presented for whole enterprises or parts of enterprises, i.e., split along establishment lines, according to the requirements of the classification. (Ref. par. 24).

(4) That where enterprise data is to be presented by industry, split along establishment lines, the nature and extent of such splits be indicated, as for example, by item 8 in table IX. (Ref. also par. 24).

II.(1) That the criterion according to which enterprises and establishments be classified by size be 'average number of persons employed' during the period of operations. (Ref. par. 15 to 22, and 25).

(2) That enterprises and establishments (together with data as recommended in III hereunder), classified by size, be cross classified by industry classes and sub-classes (Ref. par. 5, 7, 12) and,

(3) that such data be presented for the whole of Australia, for the individual States and, within States, by geographical sub-division where possible. (Ref. par. 2).

III. That, in addition to the number of enterprises and the number of establishments, the following item of data be classified by size:-
(a) number of persons engaged, (b) salaries and wages paid,
(c) value of production, (d) sales of output and, (e) capital expenditure. (Ref. par. 2 and Appendix)

IV. That, as regards the number and span of size classes, the following be adopted:- 1-4; 5-9; 10-19; 20-49; 50-99; 100-149; 150-199; 200-249; 250-299; 300-399; 400-499; 500-749; 750-999; 1000 and over. (Ref. par. 26, 27.)

V.(1) That, as regards the collection of census data, the term 'size cut-off point' be defined as the employment level chosen to distinguish small from larger establishments. (Ref. par. 28).

(2) That, where a census of establishments is to be conducted at infrequent intervals, information from all establishments be collected; but that the information collected from small

establishments be limited to items which can be obtained without much difficulty, e.g., employment, salaries and wages, nature of activity, etc.

(Ref. par. 28)

- (3) That, where a census of establishments is to be conducted at more frequent intervals, e.g., annually, information from larger establishments only be collected and, that special censuses of small establishments be conducted as and when required.

(ref. par. 28)

- (4) That, as regards future censuses of manufacturing establishments (excluding repair establishments), the size cut-off points, suggested in table VIII, para. 31, be used:-

(a) to distinguish small from larger establishments in censuses which are to be conducted at infrequent intervals,

(b) to exclude small establishments from surveys based on census data of larger establishments only.

(Ref. par. 28, 29, 30, 31)

- VI. That, as regards the presentation of data classified by size, the method illustrated in table IX below be considered:-

TABLE IX

Classification of Establishments, Enterprises and other Data in each Industry according to Number of Persons Employed.

Industry and Item	Total	Average Number of persons employed			
		1-4	5-9	10-19	etc.
II.1. Bricks and tiles					
1. Enterprises (a) (no.)					
2. Establishments "					
3. Employment "					
4. Salaries & Wages (£'000)					
5. Value of Production "					
6. Sales of Output "					
7. Capital Expenditure "					
8. Establishments classified to other industries (b) (no.)					
II.2. Earthenware, china, etc.					
1. Enterprises (no.)					
2. etc. "					

Notes:- (a) The data presented, by individual industries, relates to whole enterprises and parts of enterprises (split along establishment lines) classified to this industry. Because the item 'number of enterprises' contains whole enterprises as well as parts of enterprises the total number of enterprises does not equal the sum of enterprises in the different industry classes and sub-classes in this table.

(b) Item number 8, 'Establishments classified to other industries', relates to parts of enterprises consisting of one or more establishments which, though associated as regards ownership and control with parts of enterprises in this industry, have been classified to other industry classes according to the nature of their output.

VII. That a measure of the degree to which employment and value of output, or preferably, sales of output is concentrated in the 4 largest enterprises in the different industry classes and sub-classes be published for the whole of Australia and by States. In this respect the following method of presentation is suggested:-

TABLE X.

Concentration of Employment and Sales of Output by Industry.

Industry	Total Number of Enterprises (whole and split)	Particulars for the 4 largest enterprises and per cent of total for each industry.			
		Enterprise no.	Establish- ment no.	Employ- ment no.	Sales (£'000)
Example Industry	40	4 10%	7 9%	8,000 45%	9,000 49%
etc.					

(Ref. par. 2, 8, and Appendix)

Arne Brauer

20th May 1963

APPENDIX

In the following information from U.K., U.S., N.Z. and Canadian publication is presented to illustrate certain aspects of size classification:-

A. As regards items of data which are classified by size:-

U.S.A. (1) Number of establishments, (2) number of employees, (3) salaries and wages, (4) value added, (5) value of shipments and, (6) capital expenditure.

U.K. (1) Number of enterprises, (2) number of establishments (3) number of employees, (4) total sales, (5) net output, (6) wages and salaries, (7) capital expenditure and, (8) net output per person engaged.

N.Z. (1) Number of establishments, (2) number of persons engaged, (3) salaries and wages paid, (4) cost of materials, (5) value of output and, (6) value added.

Sources:- (1) U.S.A. Bureau of the Census, Census of Manufactures, 1958. Industry Reports.

(2) U.K. Board of Trade. Report on the Census of Production for 1958. Lond. H.M.S.O. 1960.

(3) N.Z. Department of Statistics. Report on the Industrial Production Statistics of N.Z. for the year 1959-60.

B. As regards measures of concentration:-

U.S.A. The following measure is published:- sales concentration measured by value of shipments in respect of the 4, 8 and, 20 largest companies. A company comprises all manufacturing establishments owned by the company together with those subsidiaries or affiliates over which the company has acknowledged control. The size of companies is being measured by value of shipments.

Canada

Industry	Number of establishments employing 200 or more persons	Percentage of total establishments in the industry	Percentage of total shipments in the industry
E.g., Pulp & paper	77	61.6	94.1

U.K.

Industry	Total Number of Enterprises (no.)	Particulars for the 3 or more largest enterprises and per cent of total for each industry				
		Enterprises (no.)	Establishments	Total sales £'000	Net Output £'000	Employment (no.)
E.g., Grain Milling	542	4	69 10.1	158,016 49.1	29,294 43.3	15,495 45.7

- Sources:- (1) U.S.A. Statistical Abstract, 1960. p 791-792.
 (2) Canada. Canada Year Book, 1957-58. p. 676-679.
 (3) U.K. Board of Trade. Report on the Census of Production for 1958. Lond. H.M.S.O. 1960.